



**NTSB** National Transportation Safety Board

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*Office of Highway Safety*

# Fire Cause and Propagation

# Cause and Origin

- Fire originated in right-side wheel well
- Failed wheel bearing caused friction
- Excessive heat built up in wheel and brake components
- Heat ignited rubber tire



# Tire Fire Testing

Wheel bearing failure:

- Wheel component temperatures can exceed 1300° F
- Heat spreads through hub and rim
- Heat ignites tire





# Tire Fire Testing

Tire fires are hard to put out:

- Superheated wheel components are difficult to cool down
- Access to components is limited
- Hot hub and brake components reignite tire



# Detection and Suppression

- Heat detection and suppression systems
  - Confine suppression agent to area of origin
  - Located in engine compartments and confined spaces
- No systems for wheel wells and tire fires
- Early detection and monitoring are critical for fire prevention



# How the Fire Spread

- From tag axle tire to other tires
- To wheel well combustibles
- To fuel lines, engine compartment
- Up motorcoach combustible exterior
- Through sidewall materials and windows
- Into motorcoach interior

# Fuel System Integrity

- Nonfire-resistant fuel lines spill fuel if burned through
- Fuel lines located near wheel well fire source
- Fuel involvement accelerates fire and limits passenger evacuation time
- FMVSS 301 does not apply to motorcoaches



# Burnthrough of Exterior

- Lightweight and combustible exteriors
- Flammability standards for interior materials only
- Fire can spread into passenger compartment
- Passengers exposed to smoke and heat
- Interior exposed to heat and open flame



# Summary

- Detection systems for early warning
- Fire protection for fuel systems
- Fire-hardening of exteriors



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